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Emerging Markets Queries in Finance and Business

Education and innovation in the context of economies globalization

Mihai Mihaela[a,*], EmiliaŢiţan [a]

[a] *The Bucharest University of Economic Studies, Bucharest, postal code: 010374, Romania*

Abstract

Innovation is an essential element to generate sustained economic growth. But, we cannot speak of innovation without a high level of education or a high standard of living. As you well know Global Innovation Index (GII) provides a means of evaluating the innovation of performance evaluation and refining policy innovation policies for optimum growth of the economy. But this social and economic future development depends on the intellectual and human resources progress of the company. That is, the education of future requirements of the company. This implies a change in the techniques and methods used in education by understanding this social phenomenon as being capable of creating versatile individuals, responsible, capable of reasoning and learning innovative forward -looking. Moreover, the GII is a guide which aims at the development of innovation policy to verify that performance on the one hand due to the ability of an economy to innovate, and I refer here in particular to human capital and research, and on the other hand, the performance of innovation, that is, an economy with regard to the results-based-generated the two pillars of exit (knowledge and technology outputs and creative outputs). In this context, in the work of analyzing, comparing these indices we note that among them there is a close correlation which involves finding the combination of policies to ensure the sustainability of public finance on the one hand, and economic growth and employment on the other.

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Keywords: Education; Innovation; GII; HDI; Education Index

* Corresponding author. Tel.: +40-0721-283-704.
E-mail address: mihaela2173 @yahoo.com.

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1. Globalisation of the economy

In recent years we can may easily observe that the Nations are moving with big steps towards globalization. This concept can be interpreted from four different angles: geographical, economic, political and electronics. The last gives the meaning and characteristics of the current globalization from now i.e. in the socio-political context present new technologies allow extremely rapid communication. This gives us the sensation of a global state, in any event, spent in a corner of the planet is found, almost instantly in the other corner.

In the same context, we can say that national economies are evolving under the influence of globalization generated by globalization.

If we refer to our country, Romania climbed a position until the 31st, in 60 markets analyzed in a ranking conducted by consulting company Ernst & Young audit, depending on the degree of globalization of the economy. According to the same sources, Romania occupies the 11th position among those 22 markets growing rapidly monitored during the study. We have outstanding results, so if we take into account the labor movement where we are now with 0.77 points above average overall, but also some less worthy: If we refer to the exchanges of technology and ideas, where the value is 0.51 points below average, and the movement of capital and finance, with a value of 0.25 points below average.

2. Using Multiple Regression model analysis

2.1. Identification of model variable

Why education? Why innovation?

No State can exist without education. We cannot talk about culture and technology in a country with a low level of education or of the human development index. In everyday life, we can be inventive or creative, but at national level is not enough to be just talented. The talent, if isn't trained is lost. Extrapolating, I can say that a nation without education may not be an innovative country.

2.2. Definition of multiple model assumptions

As the globalization, in my opinion you need to start from a basic premise; upgrading. This means first and foremost but industrialization and rationalization, bureaucratization, urbanization, individualization. While the process of globalization progresses, traditional pale in the face of rules of new values: innovation and education. On the other hand, if we talk about globalization, we cannot forget and the effects thereof. Besides enhancing the effectiveness of global economic activities, if we think about the migration of capital, investments, technology and manpower to areas and areas more profitable, there is also less pleasant side: that of reducing employment in developing countries or in those where labor productivity has a low level.

At the same time we must not forget that these factors, quantified in the form of indices: the globalization of Innovation index (GII), L index of education (EI) and unemployment rate, influence – at both the micro and macro-economic situation of a country. This reflects the evolution of the Human Development Index (HDI).

To demonstrate the link between four indices and dependency of them we chose to analyze their values, 2012, for the countries of the European Union by means of multiple regression.

In this model, the following notations are used for variables which are expressed in real units:

- The index of human development is symbolized with the HDI;
- Global innovation index is denoted by GII;
- Education Index represented by EI;
- Unemployment rate denoted UR;

- a – the free term;
- b – the sensitivity of HDI compared to GII;
- c – the sensitivity of HDI in relation to EI;
- d – the sensitivity of HDI in relation to UR
- ε – residual variable.

The parameters b, c and d shows how with many units changed HDI when GII, EI and UR, grow up with one unit.

By exploiting the above notations, the mathematical model may be defined as follows:

$$HDI = a + b \cdot GII + c \cdot EI + d \cdot UR + \varepsilon \quad (1)$$

As we know, in this model, we study the causal relationship between HDI, the dependent variable, and the endogenous exogenous variables: GII, EI and UR. But in measuring the HDI trends analysis of the basic characteristics of the measurement errors may occur or unpredictable component. For these reasons we need the ε, the variable residual.

Table 1. Multiple regression – 4 indices

Dependent Variable: HDI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.688951	0.061363	11.22755	0.0000
GII	0.003746	0.001160	3.228536	0.0056
EI	0.008287	0.029978	0.276434	0.7860
UR	0.001885	0.001262	1.493793	0.1560

R-squared	0.576844	Mean dependent var	0.899105
Adjusted R-squared	0.492213	S.D. dependent var	0.040352
S.E. of regression	0.028755	Akaike info criterion	-4.075358
Sum squared resid	0.012403	Schwarz criterion	-3.876529
Log likelihood	42.71590	Hannan-Quinn criter.	-4.041708
F-statistic	6.815983	Durbin-Watson stat	1.418650
Prob(F-statistic)	0.004053		

2.3. Estimation of parameters, the validation of regression model, and making predictions for variable endogenous.

After data analysis using Eviews 7.2 software package only notice that only exogenous variable can be considered important in terms of statistics (probability < 5%), namely: GII with a probability of 0.56%.

Determinative coefficient, R-squared, show the proportion of the total variation of the endogenous variable that is explained by the independent variables and take values between 0 and 1. Note that the 57,68% (R-squared) of the variation in the Human Development Index is determined by the three economic variables observed, which means that the variation of 42.32 is explained by the noneconomic variable.

At the same time we note that the probability associated with the F-test statistics, ~ 0.41%, is less than 5% which means the model is valid, i.e. we can accept – a very small error – that there is a linear dependence between HDI and GII, and your shape:

$$HDI = 0.688951 + 0.003746 \cdot GII + 0.008287 \cdot EI + 0.001885 \cdot UR \quad (2)$$

Let us not forget that every time we introduce a regression in new exogenous variable correlated with the dependent variable, R-squared is improved, although it loses a degree of freedom. This can be verified by comparing the results that can be seen in tables 1 and 2.

Table 2. Multiple regression – 3 indices

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.740152	0.057357	12.90427	0.0000
GII	0.003165	0.001228	2.577132	0.0203
EI	0.004551	0.033358	0.136434	0.8932
R-squared	0.513884	Mean dependent var		0.899105
Adjusted R-squared	0.453119	S.D. dependent var		0.040352
S.E. of regression	0.029841	Akaike info criterion		-4.041914
Sum squared resid	0.014248	Schwarz criterion		-3.892792
Log likelihood	41.39818	Hannan-Quinn criter.		-4.016677
F-statistic	8.456976	Durbin-Watson stat		1.388924
Prob(F-statistic)	0.003118			

As shown, the value of R^2 increased after the introduction of a new independent variables, and the unemployment rate, from 0.513884, in table 2, at 0.576844, in table 1.

3. Interpretation of results

In this section I will present the proposed model generation and estimate knowing that estimation of parameters of the model was done using the method of least squares and, as I mentioned above, EViews software, version 4.5. The results of the estimates are presented in table 1.

Values: 0.0056; 0.7860 and 0.1560 represents the probability associated to parameters b, c, and d, for a relevant meaning of a parameter, that proximity to 0. The value of a parameter is close to 0, so that it becomes meaningful. As noted in table 1, we can consider relevant Global Innovation index.

Determination report, R^2 (R-squared) they use to determine the quality of the model and takes values in the range [0, 1]. In the analyzed example R2= 0.576844, it follows that the endogenous variable 57.68% (HDI) is due to the three independent variables. Here, we have the result that the model is good.

On the other hand, Adjusted R-squared = 0.492213 we're using in order to highlight the number of variables included in the model to be a danger, as well as the number of observations upon which the model parameters were estimated. Note that the value is smaller than that of R-squared, which is normal taking into account that we use a multifactor model

3.1. Verification of my hypothesis

As you well know, this test will check if your chosen model parameters differ significantly from 0 or not to verify the null hypothesis using the t test econometrically by testing part model. Thus, emit null hypothesis, in which case the parameters: b, c, d would take the value 0. Under these circumstances, using the t test for estimation these parameters, we get the following results: 11.22755; 3.228536; 0.276434 and 1.493793.

On the other hand, if the probabilities associated with the parameters we can say: in the case of the parameter b values lower than 0.05 percent, which means that is statistically significant, while the c and d,

where the values are greater than 0,05, meaning that disruptions in activity and system malfunctions are not relevant in the valuation model.

Durbin Watson statistic (DW) is a statistical test which tests the serial error correlation . It is based on the assumption that the errors in regression model are generated by a autoregressive process. If the errors are not correlated, then the value of the DW will be around 2. Durbin-Watson statistic range in value from 0 to 4. A value of 2 indicates non-autocorrelation; the value 0 indicates the positive autocorrelation; a value of 4 indicates the negative autocorrelation. In the present case, the value of Durbin-Watson is 1.418650.

Concluding the first part represented by statistical tests R-squared and the F Statistic is the most important part of the output of the test. Everything in terms of importance, including the probability associated to these tests. Of the null hypothesis that the two tests, it appears that there is no serial correlation equation of regression errors. But, where the likelihood of both tests is associated with lower levels of relevance on which you are working, then the null hypothesis is rejected. Here, we not only to reject the absence of serial correlation. Otherwise, there is no correlation, so the null hypothesis is accepted.

4. Conclusions

In a competitive market with a globalized economy, we can say that innovation is the soul of competitiveness, both at the micro and macro level.

Innovation is the result which, alongside other factors more or less important, maybe it's the main source. Therefore, a coherent innovation policy is based on an educational system.

If we make a comparison between the top 15 regions that spend at least 3.5 percent of its GDP on research and development, and here we are referring to Germany, Sweden, Finland, Britain and France, we note that the same country that you find in the top and in the classification of countries in terms of HDI.

If we refer to our country, of statistical data analysis noted large gaps with ease between Romania and the innovation rates of other countries. In the context of studying, without forgetting the fact that we live in the heart of the European Union, taking account of the current crisis, we can see that you don't have to resort to cutting investment in education and in innovative ideas.

Vital to the process of development of a nation, for a high standard of living, are: education, research and innovation.

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